

REMARKS

Reconsideration of the application in view of the above amendments and the following remarks is requested. Claims 16-17, 19-29, and 31-38 are in this application. Claims 16, 19, and 31 have been amended. Claims 1-15, 18, and 30 have been cancelled. Claims 34-38 have been added to alternately claim the present invention.

The present application was filed with 11 sheets of informal drawings and 10 sheets of formal drawings. To remove any confusion as to which drawings should be printed with the patent, applicant requests that the drawings filed with the application be replaced with the ten sheets of replacement drawings attached in Appendix A. The replacement drawings are identical to the formal drawings filed with the application. By approving the present set of replacement drawings, the present set of replacement drawings will be the drawings printed with the patent.

Applicant requests the Examiner to initial and return the Form 1449 filed with the application.

The Examiner rejected claims 16-17 and 19-24 under 35 U.S.C. §103(a) as being unpatentable over Kameyama et al. (U.S. Patent No. 5,077,227) in view of Chu et al. (U.S. Patent No. 6,426,265). In addition, the Examiner objected to claims 18 and 25-33 as being dependent upon a rejected base claim, but indicated that these claims would be allowable if amended to be in independent format including all of the limitations of the base claim and any intervening claims.

Independent claim 16 has been amended to include limitations from objected-to claim 18 (as well as amendments to add further clarity to the claims), and recites, in part:

“an intrinsic base region of a second conductivity type formed on the epitaxial layer, the intrinsic base region including silicon and germanium, and having a first top surface and a vertically spaced-apart second top surface;

“an isolation region formed on the first top surface and the second top surface of the intrinsic base region, the isolation region having a side wall.”

In rejecting the claims, the Examiner pointed to Kameyama as teaching all of the limitations of claim 16 except for the use of a silicon germanium intrinsic base. Specifically, the Examiner pointed to FIG. 3 of Kameyama and the U-shaped base region, which has side arms 240A and a central portion 240B, as constituting the intrinsic base region of claim 16. The Examiner pointed to the top surface of the central portion 240B of the U-shaped base region as constituting one of the top surfaces required by claim 16, and the top surfaces of the side arms 240A as constituting the other top surface required by claim 16. In addition, the Examiner pointed to isolation regions 232A and 232B as constituting the isolation region of claim 16.

However, as shown in FIG. 3, although Kameyama teaches that isolation regions 232A and 232B contact the top surfaces of the side arms 240A of the U-shaped base region, isolation regions 232A and 232B do not contact the top surface of the central portion 240B of the U-shaped base region. Rather, emitter region 260 shown in FIG. 3 of Kameyama contacts the top surface of the central portion 240B.

Thus, since the Kameyama reference does not teach or suggest an isolation region that contacts both the first and second top surfaces of the intrinsic base region, claim 16 is patentable over Kameyama in view of Chu. In addition, since claim 17 depends from claim 16, claim 17 is patentable over Kameyama in view of Chu for the same reasons as claim 16.

Independent claim 19 has been amended to include limitations from objected-to claim 30 (as well as amendments to add further clarity to the claims), and recites, in part:

“an isolation region that contacts the top surface of the base region, the isolation region having a substantially vertical side wall;

“a first emitter region that contacts the isolation region, the first emitter region having a first substantially vertical side wall that contacts the vertical side wall of the isolation region; and

“a second emitter region that contacts the base region and the first emitter region, the vertical side wall of the isolation region lying over the second emitter region, the first emitter region having a second substantially vertical side wall that contacts the second emitter region and is spaced apart from the isolation region.”

In rejecting the claims, the Examiner pointed to isolation regions 232A and 232B shown in FIG. 3 of Kameyama as constituting the isolation region of claim 19. In addition, the Examiner pointed to region 250A shown in FIG. 3 of Kameyama as constituting the first emitter region of claim 19, and emitter region 260 shown in FIG. 3 of Kameyama as constituting the second emitter region of claim 19.

However, as shown in FIG. 3, Kameyama does not teach that the outer vertical side wall which is spaced apart from the isolation regions 232A and 232B (the second substantially vertical side wall) contacts the second emitter region (emitter region 260). Thus, since Kameyama does not teach or suggest an outer vertical side wall that contacts the second emitter region, claim 19 is patentable over Kameyama in view of Chu. In addition, since claims 20-29 and 31-33 depend either directly or indirectly from claim 19, claims 20-29 and 31-33 are patentable over Kameyama in view of Chu for the same reason as claim 19.

With respect to new claim 34, this claim recites, in part:

"an intrinsic base region of a second conductivity type formed on the epitaxial layer, the intrinsic base region including silicon and germanium, and having a first top surface and a vertically spaced-apart second top surface;

"an extrinsic base region formed in the second top surface of the intrinsic base region;

"an isolation region that contacts the first top surface of the base region, the isolation region having a substantially vertical side wall."

If the intrinsic base region of claim 34 is read to be base region 240A/240B shown in FIG. 3 of Kameyama, then there is no structure which can be read to be an extrinsic base region. As shown in FIG. 3, the extrinsic base regions 220A and 220B contact the bottom side surface of base region 240A/240B. As a result, new claim 34 is patentable over Kameyama in view of Chu. In addition, since new claims 35-38 depend either directly or indirectly from new claim 34, new claims 35-38 are patentable over Kameyama in view of Chu for the same reasons as claim 34.

Thus, for the foregoing reasons, it is submitted that all of the claims are in a condition for allowance. Therefore, the Examiner's early re-examination and reconsideration are respectively requested.

Respectfully submitted,

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By: \_\_\_\_\_



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